

REMARKS / DISCUSSION OF ISSUES

Claims 1-2 and 4-21 are pending in the application; claims 17-21 are newly added. No new matter is added.

The specification is amended to correct a typographical error. No new matter is added.

The Office action rejects claims 1-7 and 16 under 35 U.S.C. 112, second paragraph. Reconsideration of this rejection is requested in view of amended claim 1.

The Office action references claims 11-13 and 15-16 without expressly rejecting these claims.

With regard to claims 11-13, the applicants note that claim 11 is dependent upon claim 10. Claim 10 provides the proper antecedent basis for the second distance in claim 11, and claim 11 introduces "a third distance". Neither claim 12 nor claim 13 references distances.

With regard to claims 15-16, the courts have repeatedly held that words of approximation, such as "substantially", do not render claims indefinite:

"the term 'substantially' is a descriptive term commonly used in patent claims to 'avoid a strict numerical boundary to the specified parameter,' *Verve, LLC v. Crane Cams, Inc.*, 311 F.3d 1116, 1120 (Fed. Cir. 2002).

"The term 'substantial' is a meaningful modifier implying 'approximate,' rather than 'perfect.'" *Liquid Dynamics*, 355 F.3d at 1368.

In *Cordis Corp. v. Medtronic AVE, Inc.*, 339 F.3d 1352, 1361 (Fed. Cir. 2003), the court refused to impose a precise numeric constraint on the term "substantially uniform thickness," noting that the proper interpretation of this term was "of largely or approximately uniform thickness" unless something in the prosecution history imposed the "clear and unmistakable disclaimer" needed for narrowing beyond this plain-language interpretation. *Id.* Moreover, in *Anchor Wall Sys. v. Rockwood Retaining Walls, Inc.*, 340 F.3d 1298 (Fed. Cir. 2003), the court held that "the phrase 'generally parallel' envisions some amount of deviation from exactly parallel," and that "words of approximation, such as 'generally' and 'substantially,' are descriptive terms 'commonly used in patent claims' to avoid a strict numerical boundary to the specified parameter." *Id.* at 1311.

The Office action rejects claims 8-9 and 14-15 under 35 U.S.C. 102(b) over Thompson et al. (USPA 2003/0068528, hereinafter Thompson). The applicants respectfully traverse this rejection.

Thompson does not teach a light-emitting device that includes a hole blocking layer, located between an electroluminescent layer and a hole transport layer, for preventing injection of holes into the electroluminescent layer, wherein a first highest occupied molecular orbital (HOMO) energy level of the hole blocking layer is lower than a second HOMO energy level of the hole transport layer.

The Office action asserts that Thompson provides this teaching at paragraphs [0013], [0034], and [0082]. The applicants respectfully disagree with this assertion. Thompson's paragraph [0013] does not address the arrangement of the blocking layer relative to the transport layer and the electroluminescent layer. Thompson's paragraph [0034] teaches the following structure:

anode/HTL (hole transport)/EBL (electron blocking)/EL (electroluminescent)...

As is evident, Thompson teaches the conventional arrangement of an *electron* blocking layer (EBL) between the hole transport layer (HTL) and the electroluminescent layer (EL), and not a *hole* blocking layer (HBL) between these layers.

With regard to the hole blocking layer, it is significant to note that, at paragraph [0033], Thompson teaches the conventional arrangement of:

anode/HTL (hole transport)/EL (electroluminescent)/HBL (hole blocking)...

That is, Thompson's hole blocking layer is arranged to prevent holes from leaving the electroluminescent layer, it is not configured to reduce the number of holes entering the electroluminescent layer, as taught and claimed by the applicants.

At paragraph [0082], Thompson teaches that the hole blocking layer has a lower HOMO energy level than the dopant that forms the hole transport level *within* the electroluminescent layer. As Thompson teaches: "the dopant acts as a trap for holes and can be the principle hole transporter of the emissive layer", further refuting the assertion that Thompson's hole blocking layer is between the hole transport layer and the emissive layer.

Because Thompson does not teach a hole blocking layer that is located between the electroluminescent layer and the hole transport layer, and specifically teaches that the hole blocking layer is beyond the hole transport layer and the electroluminescent layer, the applicants respectfully maintain that the rejection of claims 8-9 and 14-15 under 35 U.S.C. 102(b) over Thompson is unfounded, and should be withdrawn.

The Office action rejects claims 1-2, 4-7, and 16 under 35 U.S.C. 102(e) or 103(a) over Wu et al. (USPA 2005/0040392, hereinafter Wu). The applicants respectfully traverse this rejection.

Wu fails to teach a hole blocking layer arranged between the hole transport layer and the light-emitting layer when the light-emitting layer is in operation to emit light, as claimed in claim 1, upon which claims 2, 4-7, and 16 depend.

Wu teaches a reconfigurable light-emitting device, wherein different layers of light-emitting material are used to display different colors or to display different intensities. In Wu's device, the layer(s) used for hole blocking is(are) transitional, in that the layer only performs a hole blocking function below a particular temperature. Below a 'glass transition temperature' T_g , the layer is a hole-blocking layer; above that temperature, it is not a hole-blocking layer.

To select among the different layers, the blocking layers within Wu's device are selectively heated, as described below. In the following description, reference numerals below 600 refer to Wu's layers in FIGs. 2A, for which Wu presents the principles of operation at paragraphs [0048]-[0049]; the reference numerals above 600 refer to Wu's layers in FIG. 6c, referenced in the Office action, and detailed at paragraphs [0064]-[0067].

At a lower temperature, a hole blocking layer 115/637, situated 'after' the first transport and light-emitting layer 111/635, relative to the anode 10, prevents holes from entering the second light-emitting layer 119/639. Because the hole blocking layer 115/637 blocks holes from entering the second light-emitting layer 119/639, the emitted light is dependent solely on the characteristics of the first light emitting layer 111/(635 and 631). To enable activation of the second light-emitting layer 119/639, the hole blocking layer 115/637 is heated until it is above the glass transition temperature T_g , at which the holes are no longer blocked (Wu [0049]).

In operation at the higher temperature, the light-emitting layer 119/639 does not have a blocking layer between it and the hole transport layer 111/635, because the layer 115/637 is no longer a hole blocking layer. That is, when layer 115/637 is not a hole blocking layer, light-emitting layer 119/639 can emit light; when layer 115/637 is a hole blocking layer, light-emitting layer 119/639 cannot emit light.

Because Wu fails to teach a first hole blocking layer arranged between the first hole transport layer and the light-emitting layer when the light-emitting layer is in operation to emit light, the applicants respectfully request the Examiner's reconsideration of the rejection of claims 1-2, 4-7, and 16 under 35 U.S.C. 102(e) or 103(a) over Wu.

The Office action rejects claims 10-12 under 35 U.S.C. 103(a) over Thompson. The applicants respectfully traverse this rejection.

Claims 10-12 are dependent upon claim 8, and in this rejection, the Office action relies upon Thompson for teaching the elements of claim 8. As noted above, Thompson does not teach the elements of claim 8. Accordingly, the applicants respectfully maintain that the rejection of claims 10-12 under 35 U.S.C. 103(a) over Thompson that relies on Thompson for teaching the elements of claim 8 is unfounded, and should be withdrawn.

In view of the foregoing, the applicants respectfully request that the Examiner withdraw the objection(s) and/or rejection(s) of record, allow all the pending claims, and find the application in condition for allowance. If any points remain in issue that may best be resolved through a personal or telephonic interview, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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